

Format for Project Reports

Michael Weeks, *Member, IEEE*

Abstract—The abstract should be no more than 150 words. It is a short summary of the paper. If you had to re-state what your paper says in 150 words or less, what would you say? By the way, I recommend writing the abstract LAST, since it is easier this way.

For a conference paper, most people will read the abstract to see if they find it interesting enough to read the whole paper. This makes a lot of sense if you go to a conference in a topic that interests you, but find that there are 100+ other papers.

I. INTRODUCTION

You can use this file to start your own LaTeX file, and just delete the stuff you do not need. LaTeX is a lot like working with HTML: you can specify where text effects begin, and where they end.

The project reports should be like conference papers: concise and focussing on what you did.

Format: You can use the `ieee.cls` file with LaTeX. The `ieee.cls` format uses 11/16 inch margins (left and right), 3/16 inch between columns, 13/16 inch top margin, and 10/16 bottom margin. A paper formatted with this may appear to be a bit shorter. Remember that the paper is graded based on content, not how much paper is used. **This document is formatted with the `IEEEconf.cls` file.**

You can also use the `IEEEconf.cls` file. This file format uses 1 inch margins for left, right, and top, and a $1\frac{1}{8}$ inch bottom margin. It has $\frac{3}{8}$ inch between columns.

The introduction should get the reader interested, explain your motivations, and provide a quick guide to the rest of the paper.

Why is your topic important? Convince us! Where is it used? What are the applications. What will you talk about, and what did you do?

Include an overview of the rest of your paper (e.g., section 2 covers...section 3 presents...).

II. BACKGROUND

Include any relevant and specific info, e.g. hardware statistics, equipment used. There is **always** some background to cover.

Describe what other people had to say on this topic(s) (be sure to cite your references, and quote as appropriate). Describe what other people did on this topic (or related topics). In the references section, cite the papers/books that you used. Talk about problems and shortcomings of their work. Talk about how your work is different and better.

Here are some citation examples. This is a book about VLSI [4]. Also, the references contain a good conference

paper [5], and a good journal article [6]. Anything you found useful. Include textbooks from class if you want.

III. PROJECT

It is always a good idea to have text between a section header and a subheading.

A. Design

Describe your approach to the problem. Describe what you did. What you already had (and where it came from). What you added/changed. For parts, include close-up drawings (e.g. Magic screenshots).

B. Evaluation

What did/didn't work? Include graphs, equations, pictures, etc. as appropriate

Each team member must submit an individual report.

See the "paper summary feedback" on the class website for useful examples of what to do when writing a technical document.

Remember your audience - your paper should be understandable by any CS student (at your level) who has taken this class.

Things to include in the report:

- Do not use bullet points unless absolutely necessary!
- Pictures
- Your observations and measurements
- Equations
- Graphs
- Figures
- Simulation, model (E.g. our design took 200 cycles to do task #1. We ran it 10 times, and the time for each run is: 12, 15, 16, 14, 13, 15, .. Therefore, we expect the second task, which is twice as long, to take about 30 sec).

Note: If you use color graphs, make sure you use a color printer when printing the report! I have seen several reports that say things like "the blue dots represent ..., while the red ones represent...", only to have the figure printed in grey-scale.

C. ACM style

In the article "Online First: Evolving the ACM Journal Distribution Program," the ACM Publications Board presents the idea that research has moved to a primarily electronic realm, with print publications serving a secondary role [Boisvert07]. This is a big shift in thinking; previously the printed version was the standard, with online copies merely a convenient access method. ACM citations will now include a Digital Object Identifier (DOI),

a permanent identification code (like an ISBN number) which can be translated to a web address by services like <http://doi.acm.org>.

Another significant change with the ACM style is to number the pages starting at 1 for all articles. A paper with 10 pages will have page numbers 1-10, regardless of where it appears in the journal. So an article number must be introduced to properly reference the pages of the journal. Also, the date refers to when the article is posted.

Ironically, while reading my print copy of CACM, I tried to find this article on-line, only to realize that I do not have on-line access. Perhaps I do have an account and password buried somewhere. Or maybe I did not pay extra for it, since I do not read articles on-line (at least without printing them first). The print version does not list an article number, nor the DOI, and does not start at page 1. So here is my incomplete “online first” citation in ACM style:

[Boisvert07] Boisvert, R. F., Irwin, M. J., and Rushmeier, H. 2007. Online First: Evolving the ACM Journal Distribution Program. *Communications of the ACM*, Article unknown (September 2007), 2 pages. (Pages 19-20). DOI = unknown. <http://doi.acm.org/unknown>.

D. Working with L^AT_EX

You can have text in *italics* font, or in **bold** font, underlined, and even overlined. What if you want overlined text, without italics? This can be done by using `\mathrm` in the overlined specification.

Include tables and figures within your report, but be sure to refer to them within the text. Also, say where you got them if you did not create them yourself. Table I shows an example table, with baseball statistics for several teams. We see that the Panthers are arguably best since they have the most runs, the second most hits, and the fewest errors.

	runs	hits	errors
Cardinals	2	2	1
Panthers	4	8	0
Tigers	2	3	2
Braves	3	10	3

TABLE I
AN EXAMPLE TABLE

What if you want to include a figure? Here is an example, figure 1, that is saved in encapsulated postscript format. It shows an example of a vector from the origin to point (a, b) .

E. Here is some Computer Code

I like using the `verbatim` specification for computer code. For example, here is something that appears in several languages:

```
for (int i=0; i< MAXVALUE-1; i++)
{
```

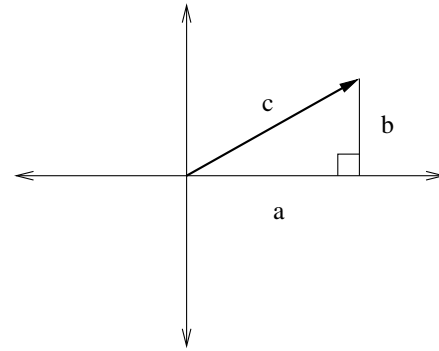


Fig. 1. Here is an example vector.

```
if (array[i] < array[i+1])
{
    temp = array[i];
    array[i] = array[i+1];
    array[i+1] = temp;
}
```

See how it makes the code stand out? I think it makes it much easier to read, too. You should also explain why you chose to include the code. That is, what are you trying to show by including it?

F. Here is some Math

This is different from the previous section, section I. This section gives some examples of Math.

Using superscript: 2^n

Using subscript: x_0

If you use a character, but LaTeX complains about it, try putting a back-slash before it. For example, $f = x^y$ uses the carat character. If you want to end a line, use 2 backslashes. If you want the backslash character `\` in your document, this can be done, too.

Here’s an equation:

$$M^\perp = \{f \in V' : f(m) = 0 \text{ for all } m \in M\}.$$

Here is how $\frac{d^2u}{dx^2}$ can be put in mathematics mode. Use the dollar sign before and after math expressions when they are in text $\frac{d^2u}{dx^2}$, or use backslashes and square brackets for a line of their own:

$$\frac{d^2u}{dx^2}$$

Here’s another equation:

$$\lim_{x \rightarrow 0} \frac{3x^2 + 7x^3}{x^2 + 5x^4} = 3.$$

Here’s a summation:

$$\sum_{k=1}^n k^2 = \frac{1}{2}n(n+1).$$

and an integral:

$$\int_a^b f(x) dx.$$

Here are some Greek letters: $\Delta\Psi\Phi$ and some lower case ones: $\delta\psi\phi\omega\pi\sigma\mu$.

IV. RESULTS

Include relevant observations, measurements, and statistics. For example, for the VLSI Class: Include statistics such as timing information if available by simulation, or if not, your own analysis about critical path, delays, and clock cycles. Be sure to include size information: the total size of the circuit measured (X lambda by Y lambda), and the transistor count.

V. SUMMARY

Try to draw together the intro, background, and project sections. How do they all relate together? (They may appear to be disjoint sections to an unfamiliar reader). Restate important results.

VI. CONCLUSIONS

You can combine Summary and Conclusions as you see fit. What was accomplished and learned. What you would have done differently. Future work.

The references must be in the same 2-column format as the rest of your paper.

REFERENCES

- [1] Joe Author, *Joe's Book About Stuff*, Publisher Press, Atlanta, GA, 2008.
- [2] Jane Scientist and Jake G. Student, "A Study of Conference Papers", *Proceedings of the 3rd International Conference on Research*, Paris, Texas, USA, January 4-6, 2008, pages 112-115.
- [3] Jane Scientist, Joe Author, and Jake G. Student, "Journal Papers are Longer than Conference Papers", *IEEE Transactions on Research*, Volume 4, Number 1, pages 212-235, March 2008.
- [4] Neil H. E. Weste and Kamran Eshraghian, *Principles of CMOS VLSI Design*, 2nd ed. Reading, MA: Addison-Wesley, 1993.
- [5] R. A. Lincoln and K. Yao, "Efficient Systolic Kalman Filtering Design by Dependence Graph Mapping," in *VLSI Signal Processing, III*, IEEE Press, R. W. Brodersen and H. S. Moscovitz Eds., 1988, pp. 396-410.
- [6] C. H. Bischof and G. M. Shroff, "On Updating Signal Subspaces," *IEEE Trans. on Signal Processing*, vol. 40, no. 1, Jan. 1992, pp. 96-105.
- [7] Richard Lyons, *Understanding Digital Signal Processing*, Addison-Wesley, 1997.
- [8] Strang and Nguyen, *Wavelets and Filter Banks*, Revised Edition, Wellesley-Cambridge Press, 1997.
- [9] Michael Weeks, Beth Lumetta, Magdy Bayoumi, "The Black Jack Tutor Chip: Dealing From Idea to Silicon," *IEEE Potentials*, April/May 1999, pages 38-42.
- [10] Guoqing Zhang, Mike Talley, Wael Badawy, Michael Weeks and Magdy Bayoumi, "A Low Power Prototype for a 3-D Discrete Wavelet Transform Processor," *IEEE International Symposium on Circuits and Systems (ISCAS '99)*, Orlando, Florida, May 30-June 2 1999, pages 80-83.
- [11] Peter Clarke (Silicon Strategies), "Silterra demonstrates 0.13-micron 8-Mbit SRAM", *EE Times*, <http://www.eetimes.com/semi/news/showArticle.jhtml;jsessionid=0JJTO0EQDLM3MQSNDBGCKHOCJUMKJVN?articleID=54201193>, posted November 30, 2004 (5:54 AM EST), accessed November 30, 2004.

APPENDIX

You are allowed to have appendices, as needed. Appendices are mainly for code or mathematical derivations. You do not have to turn in all code used in your experiment; use your best judgement. You may want to include only relevant sections of code. Appendices do **not** count in the page count. For example, if you have 4 pages of report, you may also turn in an appendix that is as long as you like. The appendix should be separate, with your name(s) on it. The appendix does not have to be in two-column format.